Volunteer Lake Assessment Program Individual Lake Reports

ONWAY LAKE, RAYMOND, NH

MORPHOMETRIC DATA

Watershed Area (Ac.):	5,867	**Max. Depth (m):**	8.9	**Flushing Rate (yr^{-1}):**	5.3
Surface Area (Ac.):	192	**Mean Depth (m):**	3	**P Retention Coef:**	0.5
Shore Length (m):	3,900	**Volume (m^3):**	2,160,000	**Elevation (ft):**	265

TROPHIC CLASSIFICATION

Year	Trophic class
1989	MESOTROPHIC
2004	MESOTROPHIC

KNOWN EXOTIC SPECIES

The Waterbody Report Card tables are generated from the DRAFT 2014 305(b) report on the status of N.H. waters, and are based on data collected from 2004-2013. Detailed waterbody assessment and report card information can be found at www.des.nh.gov/organizations/divisions/water/wmb/swqa/index.htm

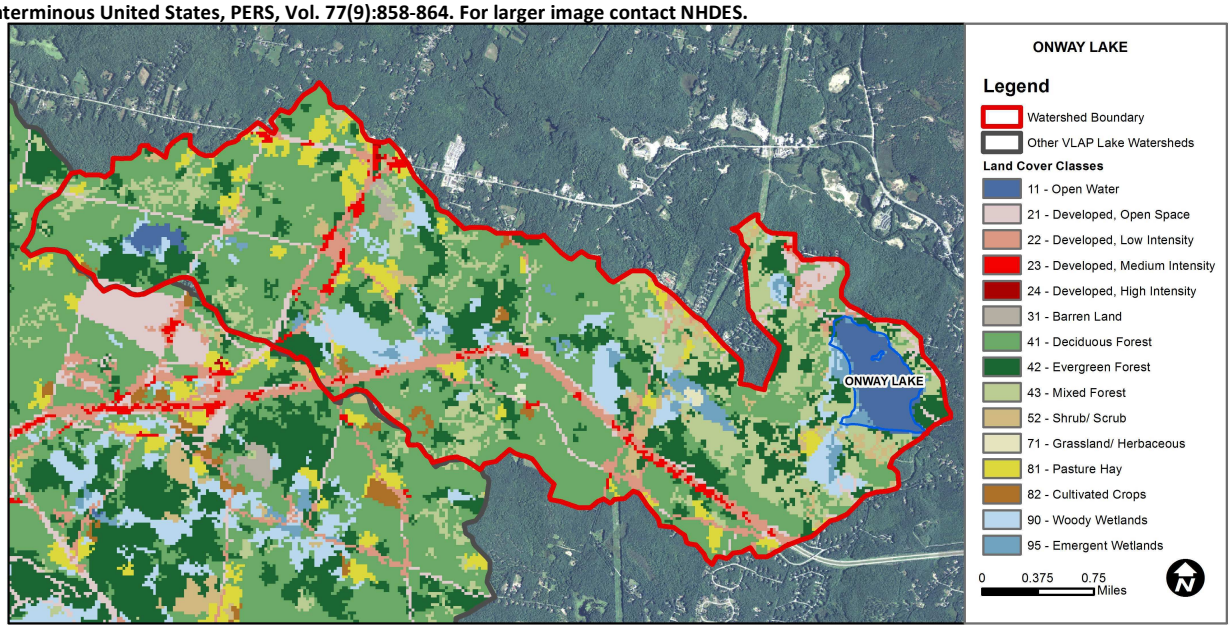
Designated Use	Parameter	Category	Comments
Aquatic Life	Phosphorus (Total)	Slightly Bad	The calculated median is from 5 or more samples and is > indicator and the chlorophyll a indicator is exceeded.
	pH	Slightly Bad	>10% of samples exceed criteria by a small margin (minimum of 2 exceedances).
	Oxygen, Dissolved	Encouraging	There are < 10 samples with 0 exceedances of criteria. More data needed.
	Dissolved oxygen satura	Slightly Bad	There are >10% of samples (minimum of 2), exceeding criteria.
	Chlorophyll-a	Slightly Bad	The calculated median is from 5 or more samples and is > indicator.
Primary Contact Recreation	Escherichia coli	Very Good	Where there are no geometric means, all bacteria samples are < 75% of the geometric mean. Where there are geometric means all single bacteria samples are < the SSMC and all geometric means are < geometric mean criteria.
	Chlorophyll-a	Very Good	There are a total of at least 10 samples with 0 exceedances of indicator.

BEACH PRIMARY CONTACT ASSESSMENT STATUS

ONWAY LAKE - CAMP ONWAY BEACH	Escherichia coli	Very Good	Where there are no geometric means, all bacteria samples are < 75% of the geometric mean. Where there are geometric means all single bacteria samples are < the SSMC and all geometric means are < geometric mean criteria.
ONWAY LAKE - RAYMOND TOWN BEACH	Escherichia coli	No Data	No data for this parameter.

WATERSHED LAND USE SUMMARY

Fry, J., Xian, G., Jin, S., Dewitz, J., Homer, C., Yang, L., Barnes, C., Herold, N., and Wickham, J., 2011. Completion of the 2006 National Land Cover Database for the Conterminous United States, PERS, Vol. 77(9):858-864. For larger image contact NHDES.



Land Cover Category	% Cover	Land Cover Category	% Cover	Land Cover Category	% Cover
Open Water	3.54	Barren Land	0.27	Grassland/Herbaceous	0.2
Developed-Open Space	3.57	Deciduous Forest	42.19	Pasture Hay	4.05
Developed-Low Intensity	5.09	Evergreen Forest	14.73	Cultivated Crops	0.45
Developed-Medium Intensity	1.41	Mixed Forest	13.37	Woody Wetlands	6.26
Developed-High Intensity	0.04	Shrub-Scrub	2.51	Emergent Wetlands	2.28

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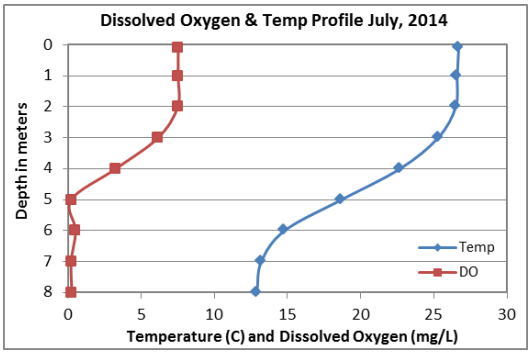
Onway Lake, Raymond

2014 Data Summary

Observations and Recommendations (*Refer to Table 1 and Historical Deep Spot Data Graphics)*

- **Chlorophyll-a:** Chlorophyll levels were slightly above average for the lake in July and slightly greater than the state median. Historical trend analysis indicates relatively stable chlorophyll levels with moderate variability between years.
- **Conductivity/Chloride:** Deep spot and tributary conductivity and chloride levels remained slightly elevated and greater than the state medians. Chloride levels indicate that winter de-icing of roads, driveways, walkways, and parking lots has impacted lake conductivity levels. Historical trend analysis indicates highly variable epilimnetic (upper water layer) conductivity levels since monitoring began.
- **E. coli:** Tributary and nearshore E. coli levels were much less than the state standard of 406 cts/100 mL for surface waters.
- **Total Phosphorus:** Epilimnetic and metalimnetic (middle water layer) phosphorus levels were within a low to average range and less than the state median. Historical trend analysis indicates relatively stable epilimnetic phosphorus with moderate variability between years. Hypolimnetic (lower water layer) phosphorus level was elevated and the turbidity was also elevated. This was likely the result of the release of phosphorus from bottom sediments when dissolved oxygen levels decrease below 1.0 mg/L, a process called internal phosphorus loading. Outlet, Island Road, Sandy Cove, and Seannikki phosphorus levels were low. Inlet phosphorus levels were within an average range and were the lowest measured since monitoring began. No Name Inlet phosphorus levels were also within an average range.
- **Transparency:** Transparency measured without the viewscope (NVS) remained stable from 2013 and was lower (worse) than the state median. Historical trend analysis indicates highly variable transparency since monitoring began. Transparency measured with the viewscope (VS) was much better than without and may be a better representation of actual conditions.
- **Turbidity:** Epilimnetic turbidity was slightly above average potentially due to stormwater runoff from a recent storm event. Metalimnetic turbidity was slightly above average potentially due to a layer of algae. Hypolimnetic turbidity was elevated potentially due to bottom sediment contamination. Tributary and nearshore station turbidities were also generally above average potentially due to stormwater runoff.
- **pH:** Epilimnetic pH was within the desirable range 6.5-8.0 units however metalimnetic and hypolimnetic pH levels were less than desirable. Historical trend analysis indicates relatively stable epilimnetic pH with moderate variability between years. Tributary and nearshore station pH levels were generally within the desirable range.
- **Recommended Actions:** The lake was sampled during a storm event and many of the station exhibited slightly elevated turbidities. This may indicate that stormwater is causing erosion of the lake and tributary shorelines and transporting sediments and other pollutants to the lake. Educate lake and watershed residents on ways to stabilize shorelines and reduce stormwater runoff from their properties. DES' "NH Homeowner's Guide to Stormwater Management" is a great resource. Encourage local road agents and winter maintenance companies to obtain a Voluntary NH Salt Applicator License through the UNH Technology Transfer Center's Green SnowPro Certification program. For more information visit www.t2.unh.edu/green-snowpro-training-and-certification.



NH Water Quality Standards: Numeric criteria for specific parameters. Results exceeding criteria are considered a water quality violation.
Chloride: > 230 mg/L (chronic)
E. coli: > 88 cts/100 mL – public beach
E. coli: > 406 cts/100 mL – surface waters
Turbidity: > 10 NTU above natural level
pH: between 6.5-8.0 (unless naturally occurring)

Table 1. 2014 Average Water Quality Data for ONWAY LAKE

Station Name	Alk. mg/l	Chlor-a ug/l	Chloride mg/l	Cond. uS/cm	E. Coli #/100ml	Total P ug/l	Trans. m		Turb. ntu	pH
							NVS	VS		
Epilimnion	6.1	4.89	42	178.0		8	2.93	3.40	1.24	6.83
Metalimnion				181.0		11			1.92	6.23
Hypolimnion				175.5		28			7.71	6.32
Dam Outlet				182.0	10	8			1.80	6.79
Inlet			52	228.0	90	15			2.47	6.37
Island Road				182.0	10	8			1.44	6.80
No Name Inlet			73	300.0	40	12			1.01	6.76
Sandy Cove				188.4	10	8			1.30	6.84
Seannikki			42	187.6	10	8			1.27	6.88

NH Median Values: Median values for specific parameters generated from historic lake monitoring data.
Alkalinity: 4.9 mg/L
Chlorophyll-a: 4.58 mg/m^3
Conductivity: 40.0 uS/cm
Chloride: 4 mg/L
Total Phosphorus: 12 ug/L
Transparency: 3.2 m
pH: 6.6

Historical Water Quality Trend Analysis

Parameter	Trend	Explanation	Parameter	Trend	Explanation
Conductivity	Stable	Trend not significant; data highly variable.	Chlorophyll-a	Stable	Trend not significant; data moderately variable.
pH (epilimnion)	Stable	Trend not significant; data moderately variable.	Transparency	Stable	Trend not significant; data highly variable.
			Phosphorus (epilimnion)	Stable	Trend not significant; data moderately variable.